

A REVIEW OF THE SPECIES OF THE GENUS *MUCRENCYRTUS* NOYES
(HYMENOPTERA: ENCYRTIDAE)

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Abstract.—The New World encyrtid genus *Mucencyrtus* is redescribed, and the species are reviewed. Five new species, *M. arundinariae*, n. sp., *M. atratus*, n. sp., *M. dbari*, n. sp., *M. ecuadorensis*, n. sp., and *M. variabilis*, n. sp. are described and illustrated. A key to species is provided.

Key Words: Hymenoptera, Encyrtidae, *Mucencyrtus*, New World, key to species, new species

The encyrtid genus *Mucencyrtus* was described by Noyes (1980) in his review of the genera of Neotropical Encyrtidae. Originally three species, all from the Neotropics, were included in the genus - *Mucencyrtus insulanus* Noyes (type species), *M. aclerdae* (De Santis) (transferred from *Aenasioidea*) and “an undetermined species from Ecuador”. Recently, the first North American species, *M. ferrierei* (Burks), was transferred to *Mucencyrtus* from *Aenasioidea* (Noyes and Woolley 1994).

In the material reared by the author from *Aclerda* sp. aff. *arundinariae* McConnell collected on cane *Arundinaria tecta* (Walter) Muhlenberg in Georgia (USA), a new species of *Mucencyrtus* was discovered. The species did not correspond to the original description of the genus because both female and male had a greatly broadened and flattened antennal scape—a feature not possessed by the species upon which the original description was based. A study of additional material from North, Central and South America revealed five other new species of *Mucencyrtus* (including the one referred to by Noyes (1980) as “an undetermined species from Ecuador”), as well as

one further undetermined species from Uruguay known only from male. Therefore, nine species are recognized in this paper. New species are described and a key to species is provided.

MATERIALS AND METHODS

Measurements were taken with a stereomicroscope equipped with a filar micrometer 15× eyepiece with a graduated knob. At the microscope magnification changer set at ×50, the rotation of one numbered division of the knob corresponded to 0.01 mm. The measurements in parentheses in the descriptions are given in units of the micrometer: an absolute value of one unit is 0.01 mm. All measurements are comparable and can be translated into millimeters by multiplying the number of units by 0.01.

Measurements were taken as shown in Figs. 3–6. I call “length” all the measurements taken along the longitudinal axis of the body, “width”—the measurements taken along the transverse axis, and “height”—the measurements taken along the vertical axis of the body.

Head length—maximum length of the head measured laterally or from above. (I

usually took both measurements to make sure that they gave the same result).

Head width—maximum width of the head measured from above or in frontal view (usually, both measurements were taken).

Head height—maximum height of the head measured in frontal or lateral view (usually, both measurements were taken).

Width of frontovertex was measured at the level of the anterior ocellus in dorsal or frontal view.

POL—postocellar line, the minimum distance between the posterior ocelli.

OOL—ocular-ocellar line, the minimum distance between the posterior ocellus and eye orbit.

LOL—lateral ocellar line, the minimum distance between posterior and anterior ocellus.

OCL—ocellar-occipital line, the minimum distance between posterior ocellus and occipital margin.

Anterior angle of ocellar triangle (α) was calculated as follows: $\alpha = 2 \arcsin \text{POcL} / 2 \text{LOcL}$, where POcL is the distance between centers of posterior ocelli, and LOcL is the distance between centers of posterior and anterior ocelli.

Eye length—maximum length of the eye measured in dorsal view.

Temple length—maximum length of the temple measured in dorsal view.

Eye height—maximum height of the eye measured in frontal view.

Eye maximum and minimum diameters were measured with the plane of the eye orbit perpendicular to the optic axis.

Distances between antennal toruli, antennal torulus and eye orbit, and antennal torulus and mouth margin are minimum distances taken in frontal view.

Malar space—minimum distance between the eye margin and the margin of the buccal cavity measured along malar sulcus (in this case the measurement was taken in frontal view).

Mouth width—maximum width of the buccal cavity measured in frontal view.

Length and width of antennal scape are maximum measurements along longitudinal and transverse axes of the scape without radicle.

Length of mesosoma—distance from anterior margin of the pronotum to the posterior margin of the propodeum.

Width of mesosoma, length and width of mesoscutum and of scutellum, length and width of metasoma, are maximum measurements taken with the optical axis perpendicular to the plane of the measured body-part.

Distance from base of metasoma to pygostyli and from pygostyli to apex of metasoma are the measurements taken from above, between the center of the cercal plate and anterior and posterior ends of the metasoma. In some critical-point-dried specimens the metasoma was overinflated, and the distances and proportions distorted. Such specimens were not used for relative measurements.

Length of ovipositor—length of exerted part of the ovipositor.

Terminology for the sculpture follows Gibson (1989).

Drawings were made from slide mounted material using a camera lucida with a compound microscope with phase contrast attachment.

Abbreviation for depositories of type materials are: AMNH (American Museum of Natural History, New York, NY, USA), CNCI (Canadian National Collection, Ottawa, ON Canada), BMNH (Natural History Museum, London, UK), MLP (Facultad de Ciencias Naturales y Museo, La Plata, Argentina), OSUC (Ohio State University, Columbus, OH, USA), TAMU (Texas A&M University, College Station, TX, USA), USNM (National Museum of Natural History, Smithsonian Institution, Washington, DC, USA).

Mucrencyrtus Noyes

Mucrencyrtus Noyes, 1980: 213–214. Type species: *M. insulanus* Noyes, by original designation.

Comments.—Because the original description was based only on three species, some of the characters used as generic features have proved to be of only specific value, and some features of generic value were not included in the description. These features, with necessary changes, are described below.

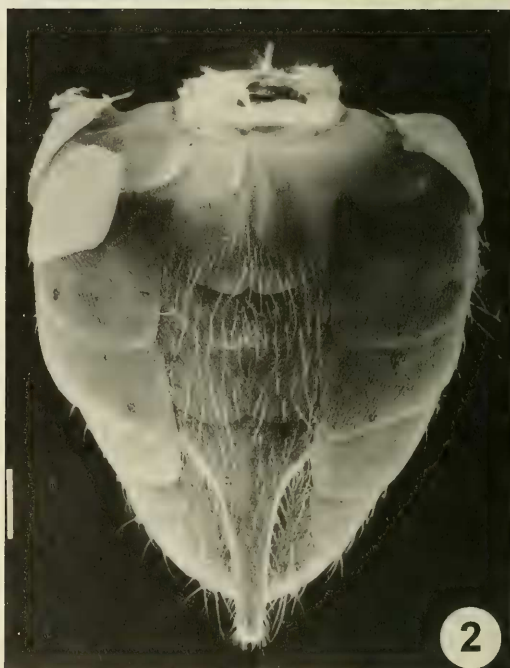
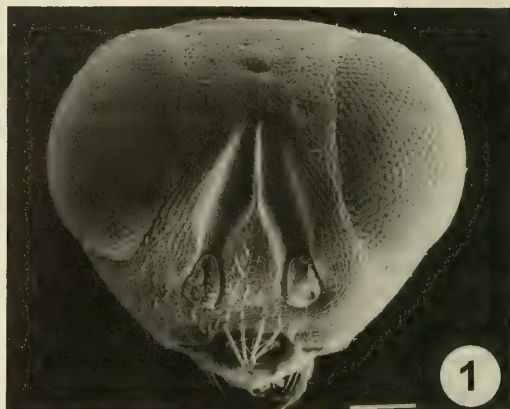
Head: Eye reaching occipital margin, or separated from the latter by the distance up to $\frac{1}{3}$ eye length (dorsal view). Malar space from less than $\frac{1}{2}$ to $\frac{2}{3}$ maximum diameter of eye; malar sulcus from weakly indicated to well expressed. Frontovortex at narrowest point $\frac{2}{5}$ – $\frac{3}{5}$ head width, ocelli forming from slightly acute- to obtuse-angled triangle, posterior ocellus separated from eye orbit by distance equal to $\frac{1}{2}$ –2 ocellar diameters. Scape subcylindrical to greatly broadened and flattened. Clava with apex rounded or very slightly obliquely truncate.

Mesosoma: Notaular lines very slightly indicated, almost absent, to well developed anteriorly. Scutellum flat to very slightly convex, with apex pointed and produced posteriorly as a very narrow translucent flange, the latter sometimes very weakly expressed and inconspicuous. Wings in both sexes from fully developed to rudimentary, with transitional forms. In microppterous forms forewing rudiments with rounded, truncate, or pointed apex.

Metasoma: Apical extension of hypopygium reaching, or almost reaching, apex of metasoma.

Diagnosis.—The genus can be readily recognized by a combination of two characters—the shape of the interantennal prominence, which is produced in its upper part as a long, sharp, narrow ridge (Fig. 1), and the shape of the hypopygium, which is produced posteriorly into a long, narrow extension reaching, or almost reaching, the apex of the metasoma (Fig. 2).

Biology of species.—All species for which the biology is known were reared from coccoids of the family Aclerdidae (Homoptera: Coccoidea), where they apparently develop as primary parasitoids.



Figs. 1, 2. *Mucrencyrtus arundinariae*, female. 1, Head, frontal view. 2, Metasoma, ventral view.

Distribution of species.—Representatives of the genus are known only from the New World, occurring in both North and South America.

Systematic position.—Although Noyes (1980) did not directly place *Mucrencyrtus* in any of the tribes of Encyrtidae according to Trjapitzin's (1973a, b) classification, he stated that it is very close to *Allencyrtus* Annecke & Mynhardt (tribe Microteriyini, subtribe Microteriyina). However, some fea-

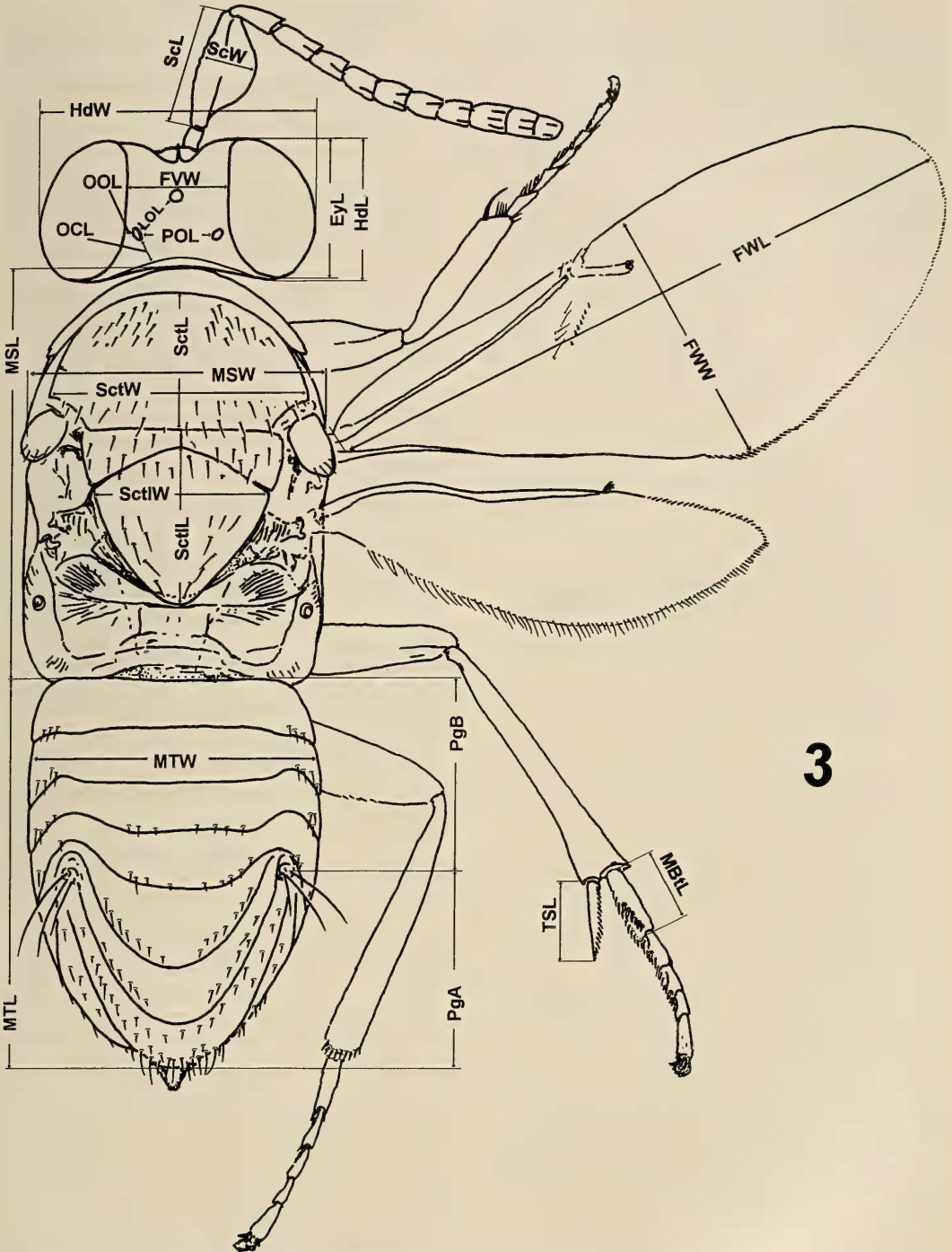


Fig. 3. *Mucrencyrtus arundinariae*, female, dorsal view. Abbreviations: EyL = eye length; FVW = frontovertex width; FWL = forewing length; FWW = forewing width; HdL = head length; HdW = head width; LOL = lateral ocellar line; MBtL = mid basitarsus length; MSL = mesosoma length; MSW = mesosoma width; MTL = metasoma length; MTW = metasoma width; OCL = ocellar-occipital line; OOL = ocellar-ocular line; PgA = distance from pygostyli to apex of metasoma; PgB = distance from pygostyli to base of metasoma; POL = postocellar line; ScL = antennal scape length; SctL = scutum length; SctIL = scutellum length; SctW = scutellum width; SctW = scutum width; ScW = antennal scape width; TSL = midtibial spur length.

tures of *Mucrencyrtus*, such as the presence of notauli and the hypopygium reaching the apex of the metasoma, do not correspond to Trjapitzin's definition of the tribe Microteryni. These features, however, agree with those of the tribe Aphycini. Weakly expressed sexual dimorphism, and absence of metallic shine, even in dark-colored species are also characteristic of most of the representatives of Aphycini. Therefore, I am inclined to include the genus *Mucrencyrtus* in the tribe Aphycini, subtribe Paraphycina, although I am not absolutely sure as to the correctness of this placement.

KEY TO SPECIES

1. Head and body completely very dark brown, or black, except for apex of scutellum, which is brownish orange, and anterolateral corners of propodeum, which are white; fore coxa brown to dark brown, about same color as mid and hind coxae
 *Mucrencyrtus atratus*, n. sp.
 – At least head orange or yellow; fore coxa white to orange yellow, same color as or lighter in color than mid and hind coxae . . . 2
- 2(1). Wings normal; forewing reaching beyond apex of metasoma 3
 – Wings shortened or rudimentary; forewing not reaching apex of metasoma, often only reaching base of metasoma 9
- 3(2). Scape subcylindrical or slightly to moderately broadened and flattened, its length not less than 2.5 times maximum width 4
 – Scape strongly broadened and flattened, its length 1.8 to 2.2 times maximum width (Fig. 27) . . . *Mucrencyrtus arundinariae*, n.sp.
- 4(3). Forewing hyaline or very slightly, uniformly suffused with yellow 5
 – Forewing with large dark central spot (Fig. 31) 8
- 5(4). Gena with brown to dark-brown spot or oblique stripe, sometimes weakly expressed (Figs. 7, 8) . . . *Mucrencyrtus variabilis*, n.sp.
 – Gena unicolorous, whitish yellow to orange yellow, without dark spot or stripe 6
- 6(5). Scape length about 3 times, or slightly less, its maximum width
 *Mucrencyrtus ferrierei* (Burks)
 – Scape length more than 3 times its maximum width 7
- 7(6). Mesopleuron same color as rest of mesosoma; axilla with dark edges and corner adjacent to central axis of body; ocelli form an obtuse-angled triangle (Fig. 6)
 *Mucrencyrtus variabilis*, n.sp.
 – Mesopleuron, especially in its posterior part, darker than rest of mesosoma; axilla unicolorous, without dark edges; ocelli form a right triangle
 *Mucrencyrtus ecuadorensis*, n.sp.
- 8(4). Head same color as mesosoma, yellow or slightly brownish yellow; distance between toruli less than 1.5 times distance between torulus and eye orbit; scape about 3 times as long as broad
 *Mucrencyrtus aclerdae* (De Santis)
 – Head orange yellow, lighter than largely dark-brown mesosoma; distance between toruli more than 2 times distance between torulus and eye orbit; scape very slightly more than 2.5 times as long as broad (Fig. 17)
 *Mucrencyrtus dbari*, n.sp.
- 9(2). Scape about 3 times as long as broad; scutellum with sculpture similar to one of mesoscutum *Mucrencyrtus ferrierei* (Burks)
 – Scape more than 3 times as long as broad; scutellum with sculpture finer and deeper than one of mesoscutum
 *Mucrencyrtus insulanus* (Noyes)

Mucrencyrtus aclerdae (De Santis)

Aenasioidea aclerdae De Santis, 1972: 18.
 Holotype female, Brazil (MLP) (not examined).

Mucrencyrtus aclerdae: Noyes, 1980: 215.

Distribution.—Brazil (Alagoas, Bahia, São Paulo).

Hosts and biology.—Reared from *Aclerda campinensis* Hempel on *Saccarum officinarum* L. (De Santis 1972), and from *Aclerda* sp.

Comments.—I have examined 3 females and 2 males of this species identified by J.S.Noyes, and 1 female identified by me. All of them have white anterolateral corners of the propodeum (adjacent to hindwing base and anterior to spiracle)—a feature not indicated by De Santis (1972). One female and both males have the anterior margin of the mesoscutum darkened (dark brown). The posterior margin of the mesopleuron is brownish white in 5 specimens (all except one female). In one female the base of the scape is yellow, the same color as its apical part. Other features agree with the original

description, and there is no doubt that these specimens belong to *M. aclerdae*.

Mucrencyrtus arundinariae Sharkov,

NEW SPECIES

(Figs. 1–4, 27–30, 32)

Female (holotype measurements in parentheses).—Body length 1.3–2.4 (1.9) mm.

Relative measurements.—*Head* width 1.82–1.9 times head length and 1.26–1.36 times head height (68:38:54). Frontoververtex width at level of anterior ocellus 0.37–0.42 times width of head (26:68). Ocelli in very slightly acute or right triangle, with an angle at anterior ocellus of 82°–90°. POL: OOL:LOL:OCL = 17:1.5:11.5:7 (in holotype). OOL approximately ½ diameter of posterior ocellus (1.5:3.3). Distance between antennal toruli 1.0–1.3 times distance between antennal torulus and eye orbit, and 1.33–1.86 times distance between torulus and mouth margin (12:10:9). Malar space 0.62–0.69 times mouth width and 0.45–0.5 times eye height (18:26:36). Eye oval, maximum diameter 1.15–1.3 times minimum diameter (39:30). Posterior orbit of eye reaching, or almost reaching, occipital margin (dorsal view). Antenna as in Fig. 27. Scape strongly broadened and flattened, length 2.08–2.2 times maximum width (24:11).

Mesosoma length 1.18–1.31 times width (73:60). Mesoscutum width 1.84–2.0 times length (60:30). Scutellum length approximately equal to width (34:34). Mid tibial spur 0.75–0.91 as long as mid basitarsus and 0.25–0.3 as long as mid tibia (16:19:59). Forewing as in Fig. 32. Forewing length 2.4–2.57 times maximum width (136:53).

Metasoma length 1.1–1.26 times width (83:66). Distance from pygostyli to base of metasoma 0.5–0.53 times corresponding distance to apex of metasoma (29:54). Hypopygium as in Fig. 28.

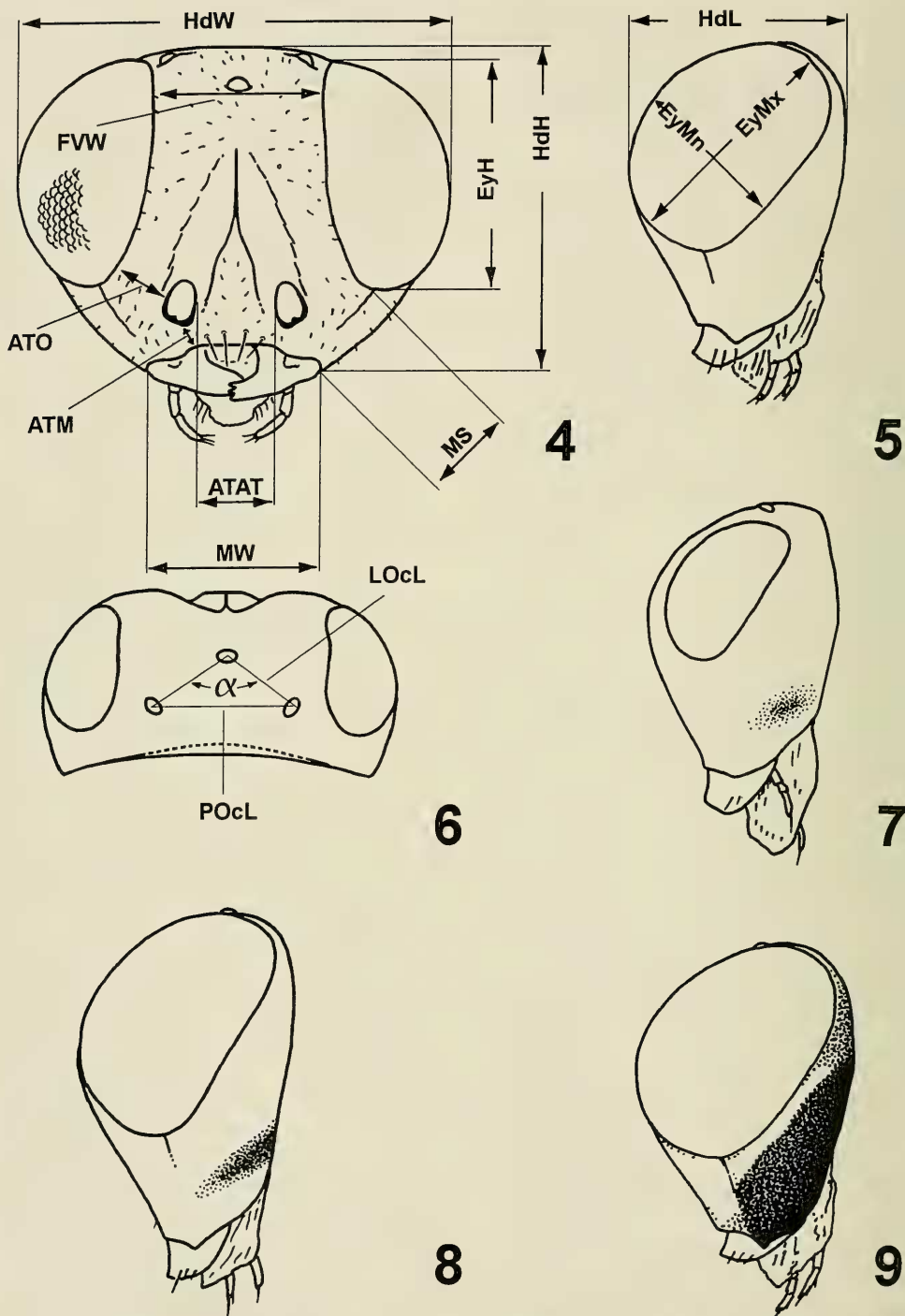
Color.—*Head*: Frontoververtex orange yellow or yellow orange. Face largely yellow, lighter, almost whitish yellow, in lower part,

and gradually becoming yellow and orange yellow in upper part. Gena and occiput yellow, lighter than frontoververtex; occiput with small dark-brown spot just above occipital foramen and with brown edges of foramen. Antenna with radicle yellow; scape very dark brown, almost black, with yellow base and apex (as in Fig. 27); pedicel dark brown, with yellow outer surface, except for brown base; funicle and clava dark brown, except for apex of clava, which is whitish light brown. Mandibles yellow basally and brown apically.

Mesosoma: Pronotum orange yellow, with brown area on that part of collum concealed by occiput. Mesoscutum, scutellum and axillae orange yellow or yellow orange; mesopleuron orange yellow, slightly lighter than mesoscutum and scutellum. Forewing very slightly infuscated in central part (Fig. 32), sometimes almost completely hyaline. All legs completely yellow. Metanotum dark brown, except central part light brown. Propodeum yellow laterally, dark brown dorsally, except for light-brown central part.

Metasoma: Brown to dark brown dorsally, with darkest coloration in central part, gradually becoming lighter toward sides and apex; its lateral and ventral parts brownish orange yellow.

Sculpture and pubescence.—*Head* (Fig. 1): Frontoververtex shallowly reticulate, with sparse scattered punctures; elements of sculpture (cells) isodiametric, except for area between posterior ocelli and occipital margin where cells are transverse. Face shallowly reticulate, with cells isodiametric on interantennal prominence, and vertically elongate between antennal scrobe and eye orbit. Gena almost smooth, very shallowly reticulate, with vertically elongate cells and very shallow, inconspicuous scattered punctures. Head almost hairless, with scattered, inconspicuous, short translucent hairs on frontoververtex and face, slightly denser setae on lower part of face, and with few longer yellowish-brown translucent hairs on clypeus.



Figs. 4-9. Heads of females. 4, 5, *Mucrencyrtus arundinariae*. 4, Frontal view. 5, Lateral view. 6-8, *M. variabilis*. 6, Dorsal view. 7, Lateral view of small-eyed specimen. 8, Lateral view of normal-eyed specimen. 9, *M. dbari*, lateral view. Abbreviations: ATAT = distance between antennal toruli; ATM = distance between antennal torulus and mouth margin; ATO = distance between antennal toruli and eye orbit; EyH = eye height; EyMn = eye minimum diameter; EyMx = eye maximum diameter, FVW = frontoververtex width; HdH = head

Mesosoma: Collar of pronotum, mesoscutum, scutellum and axillae very shallowly reticulate, with cells slightly transverse in anterior $\frac{1}{2}$ of mesoscutum, and more or less isodiametric in its posterior $\frac{1}{2}$ and on axillae and scutellum; all with appressed dark-brown setae. Metanotum transversely rugulose, except for very shallow transverse reticulate central part. Mesopleuron very minutely shallowly reticulate, with cells slightly elongate anteriorly, more or less isodiametric medially, and very slightly elongate posteriorly. Dorsum of propodeum with few rugulae laterally.

Metasoma dorsally with very shallow reticulate sculpture, with slightly transverse cells, especially so in basal part, almost hairless; ventrally with brownish translucent hairs (Fig. 2).

Male.—Body length 1.4–2.0 mm.

Relative measurements.—*Head* width 1.92–2.0 times head length and 1.26–1.34 times head height. Frontovertex width at level of anterior ocellus 0.46–0.48 times width of head. Ocelli in right or very slightly acute or obtuse triangle, with angle at anterior ocellus of 88° – 95° . POL:OOL: LOL:OCL = 16:1.5:10:5. Distance between antennal toruli approximately equal to distance between antennal torulus and eye orbit, 1.67–1.80 times distance between torulus and mouth margin. Malar space 0.74–0.91 times mouth width and 0.61–0.71 times height of eye. Eye oval, maximum diameter 1.26–1.41 times minimum diameter. Posterior orbit of eye reaching, or almost reaching, occipital margin (dorsal view). Antenna as in Fig. 29. Scape strongly broadened and flattened, length 1.77–2.11 times maximum width.

Mesosoma length 1.3–1.39 times width. Mesoscutum width 1.62–1.87 times length. Scutellum length approximately equal to

width. Mid tibial spur 0.75–0.93 as long as mid basitarsus. Forewing length 2.34–2.5 times maximum width.

Metasoma length 1.18–1.3 times width. Pygostyli situated closer to base than to apex of metasoma (in critical-point-dried specimens with overinflated metasoma they may appear to be closer to apex of metasoma). Genitalia as in Fig. 30.

Color, sculpture and pubescence similar to those in female, except as follows. Scape very dark brown, almost black, with yellow base and apex, and brownish-yellow upper edge (pattern as in Fig. 29); pedicel yellow with dark brown base; flagellum brown, lighter than in female. Occiput with part touching collum of pronotum and corresponding part of collum very dark brown. Base (in one specimen—basal $\frac{1}{2}$) of mesoscutum dark brown. Sometimes base of axillae brown, and scutellum rarely with brown spot in basal part in middle.

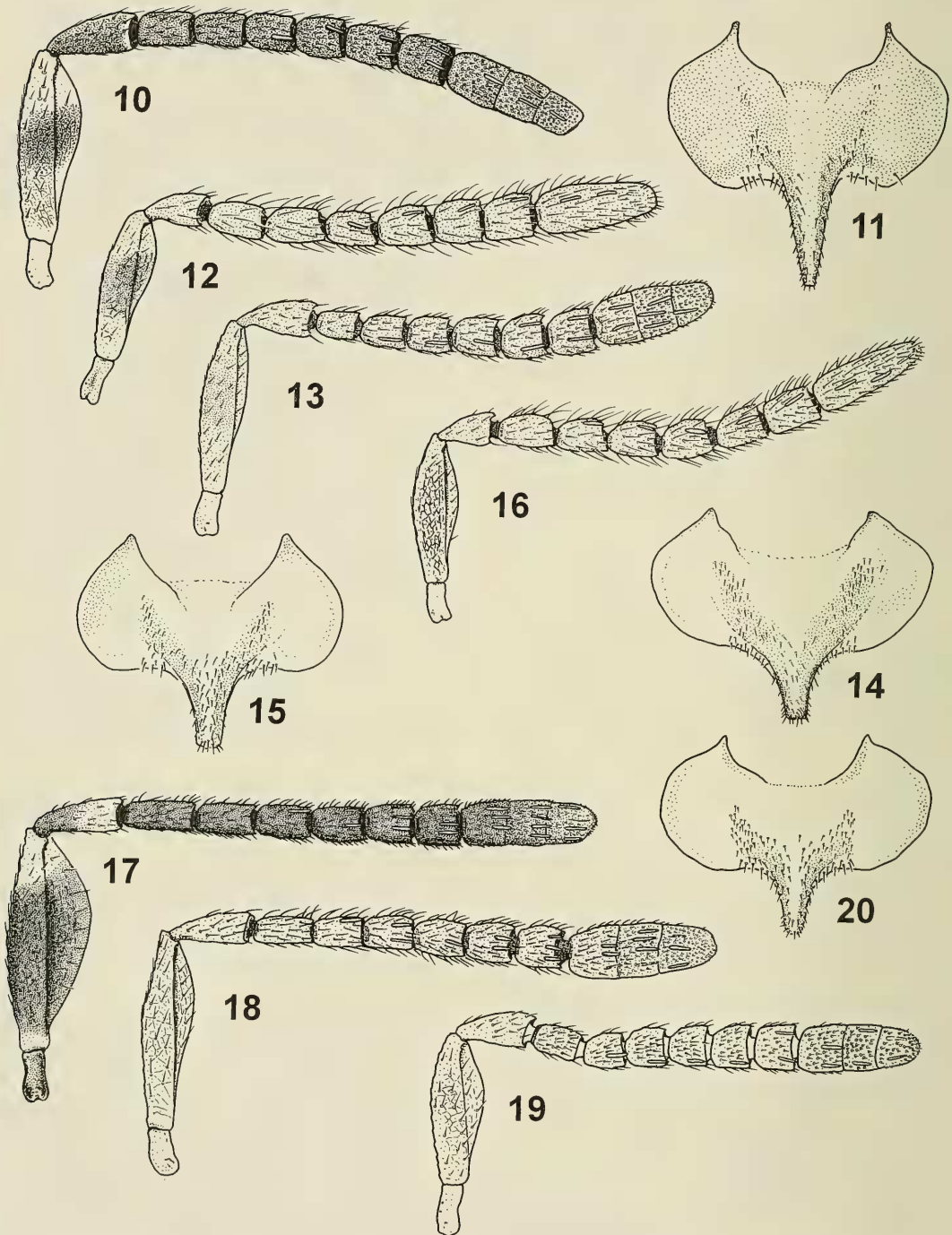
Hosts and biology.—Reared from *Aclerda* sp. aff. *arundinariae* McConnell (Homoptera, Coccoidea: Acleridae) on giant cane *Arundinaria tecta* (Walter) Muhlenberg.

Associated species.—Two other species of Encyrtidae were reared simultaneously with *M. arundinariae* sp. n.—*Comones ferrierei* (Burks) and *Cheiloneurus* sp. The former species is, probably, a primary parasite of Acleridae, while the latter one is a hyperparasite on either *M. arundinariae* sp. n. or *C. ferrierei*.

Material examined.—*Holotype* female: USA, Georgia, Liberty Co., St. Catherines Island, 7–12.viii. 1991, A. Sharkov, from *Aclerda* sp. aff. *arundinariae* on *Arundinaria tecta* (AMNH). Paratypes: same data, 6 females, 4 males (1 male in microslide # OSU-0002); same data, on *Arundinaria tecta*, sweeping, 3 females, 1 male (1 female

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height; HdL = head length; HdW = head width; LOcL = distance between centers of anterior and posterior ocelli; MS = malar space; MW = mouth width; POcL = distance between centers of posterior ocelli; α = anterior angle of ocellar triangle.



Figs. 10-20. 10-12, *Mucrencyrtus* sp. aff. *ferrierei*. 10, Female antenna. 11, Female hypopygium. 12, Male antenna. 13-16, *M. variabilis*. 13, Female antenna. 14, Female hypopygium of small-eyed specimen. 15, Female hypopygium of normal-eyed specimen. 16, Male antenna. 17, *M. dbari*, female antenna. 18, *M. ecuadorensis*, female antenna. 19, 20, *M. ferrierei*. 19, Female antenna. 20, Female hypopygium.

in microslide # OSU-0001; another female was used for SEM, its antennae, wings and legs in microslide # OSU-0003); same location, 10–15.v.1991, A. Sharkov, 3 females, 2 males; same location, 31.v–3.vi.1991, A. Sharkov, 1 female; same location, from *Aclerda* sp. aff. *arundinariae* on *Arundinaria tecta*, 1–3.vi.1992, A. Sharkov, 3 females, 3 males; same data, 1–4.iv.1994, E. Quinter, 2 females, 2 males; same data, 16–19.iv.1994, 1 male; same data, 6–10.iv.1995, A. Sharkov, 5 females, 4 males (Paratypes in AMNH, BMNH, CNCI, and OSUC).

Distribution.—USA (Georgia).

Etymology.—The name derives from *Arundinaria*—the name of a host plant for a coccid from which the new species was reared.

Diagnosis.—From other species of *Mucrocyrtus* differs by the greatly broadened and flattened scape of both females and males. From *M. dbari*, sp. n., which also has a broadened scape, *M. arundinariae*, sp. n. differs in coloration of head and body, and absence of a dark central spot on the forewing. Males also differ from all other species of *Mucrocyrtus*, for which males are known, in having digital sclerites with 3 claws (all others have 2—as in Fig. 26).

Mucrocyrtus atratus Sharkov,

NEW SPECIES

(Figs. 22–26)

Female (holotype measurements in parentheses).—Body length 1.44–1.78 (1.78) mm.

Relative measurements.—*Head* width 1.76–2.09 times head length and 1.25–1.35 times head height (62:35:46). Frontovertex width at level of anterior ocellus 0.36–0.4 times width of head (24:62). Ocelli in right, or very slightly acute or obtuse triangle, with angle at anterior ocellus of 88°–94°. POL:OOL:LOL:OCL = 15:1.5:10:7 (in holotype). OOL 0.37–0.5 times diameter of posterior ocellus (1.5:4). Distance between antennal toruli (in paratype) 1.44 times distance between antennal torulus and eye or-

bit and 1.73 times distance between torulus and mouth margin. Malar space (in paratype) 0.63 times mouth width and 0.46 times height of eye. Eye oval, maximum diameter 1.23–1.31 times minimum diameter (37:30). Posterior orbit of eye reaching, or almost reaching, occipital margin (dorsal view). Antenna as in Fig. 22. Scape very slightly broadened and flattened, length 3.13–3.33 times maximum width (22:7).

Mesosoma length 1.2–1.3 times width (72:60). Mesoscutum width 1.73–2.18 times length (60:30). Scutellum length equal to or slightly less than width (30:30). Mid tibial spur 0.83–0.94 as long as mid basitarsus and 0.29–0.3 as long as mid tibia (15:18:51). Forewing length 2.35–2.8 times maximum width (120:51).

Metasoma length equal to, or greater than width (68:58). Distance from pygostyli to base of metasoma 0.55–0.7 times corresponding distance to apex of metasoma (24:42). Hypopygium as in Fig. 23.

Color.—*Head*: Frontovertex very dark brown, almost black; face very dark brown, with interantennal prominence almost black, slightly lighter (dark brown) between antennal scrobe and eye margin toward mouth margin; gena very dark brown, almost black, slightly lighter in lower part; occiput very dark brown, almost black. Antenna with radicle brown with very dark brown upper surface; scape with whitish-light-brown base, very dark brown, almost black upper surface, except for apical ¼ or so, yellowish-brownish-white lower surface, except for very edge in basal ⅔, and yellowish-brownish-white apex; pedicel brown, with light-brown apex and dark-brown upper surface; funicle and clava brown. Mandibles brown, with apical part dark brown.

Mesosoma: Pronotum and mesoscutum black, or very dark brown; scutellum black, in posterior ¼ gradually becoming lighter toward apex, which is brownish orange yellow. Metanotum very dark brown, with median part brownish orange yellow, concolorous with apex of scutellum. Propodeum

dorsally very dark brown, except median part, which is yellowish light brown, and with white anterolateral corner (adjacent to hindwing base and anterior to spiracle). Sides of mesosoma dark brown. Tegula very dark brown. Forewing infuscated in middle part (similar to Fig. 31), and with basal $\frac{1}{4}$ or so of submarginal vein and setae in basal part of wing (proximad of fuscous spot) whitish, very light colored. Hindwing with whitish submarginal vein and setae in basal part. Coxae of all legs dark brown, with lighter brown apex. Fore femur brown, gradually becoming lighter toward apex, which is yellowish light brown; fore tibia light brownish yellow, slightly darker in middle part; fore tarsus yellowish light brown. Mid femora brown, with darker base and apical $\frac{1}{5}$ or so very light, brownish yellowish white; mid tibia, mid basitarsus and mid tibial spur brownish yellowish white, with slightly indicated brownish spot on upper surface of tibia near its base; apex of basitarsus and rest of tarsal segments slightly more brownish. Hind femur brown, with whitish-brownish-yellow apex; hind tibia light brown, lighter toward apical $\frac{1}{3}$, which is whitish brownish yellow; hind tarsus whitish brownish yellow, with second to fourth segments very slightly darker, and apical segment light brown.

Metasoma with dorsal and lateral surface very dark brown, almost black, and ventral surface slightly lighter, dark brown. Apical extension of hypopygium brown.

Sculpture and pubescence.—*Head*: Frontoververtex, face and gena reticulate, with shallow punctures. Vertex between posterior ocelli and occiput with slightly transverse cells, face between antennal scrobe and eye orbit, and gena with very slightly vertically elongate cells. Head almost hairless, except for sparse, very short, inconspicuous hairs on vertex and face, and several longer translucent hairs on clypeus.

Mesosoma: Mesoscutum very finely, superficially reticulate-punctulate; scutellum very finely, deeply reticulate, with cells much deeper than on mesoscutum and

slightly longitudinally elongate; axillae finely reticulate, with cells conspicuously deeper than on mesoscutum, but slightly shallower than on scutellum, more or less isodiametric. Pronotum, mesoscutum, axillae and scutellum with appressed translucent, very slightly brownish hairs.

Metasoma dorsally reticulate, almost hairless, laterally and ventrally with sparse translucent, slightly brownish hairs.

Male.—Similar to female in structure and color. Antenna as in Fig. 24; hypopygium as in Fig. 25; genitalia as in Fig. 26.

Color variation.—In darker specimens scape dark brown in basal $\frac{1}{2}$ or so, pedicel very inconspicuously lighter in apical part; fore femur brown, with dark-brown basal part and light-brown apex, fore tibia brown, with light-brown base, gradually becoming light brown and yellowish light brown in apical $\frac{1}{3}$; fore tarsus light brown; brownish spot near base of mid tibia more conspicuous and almost forming band; hind tibia brown with whitish-light-brown basal $\frac{1}{5}$ or so.

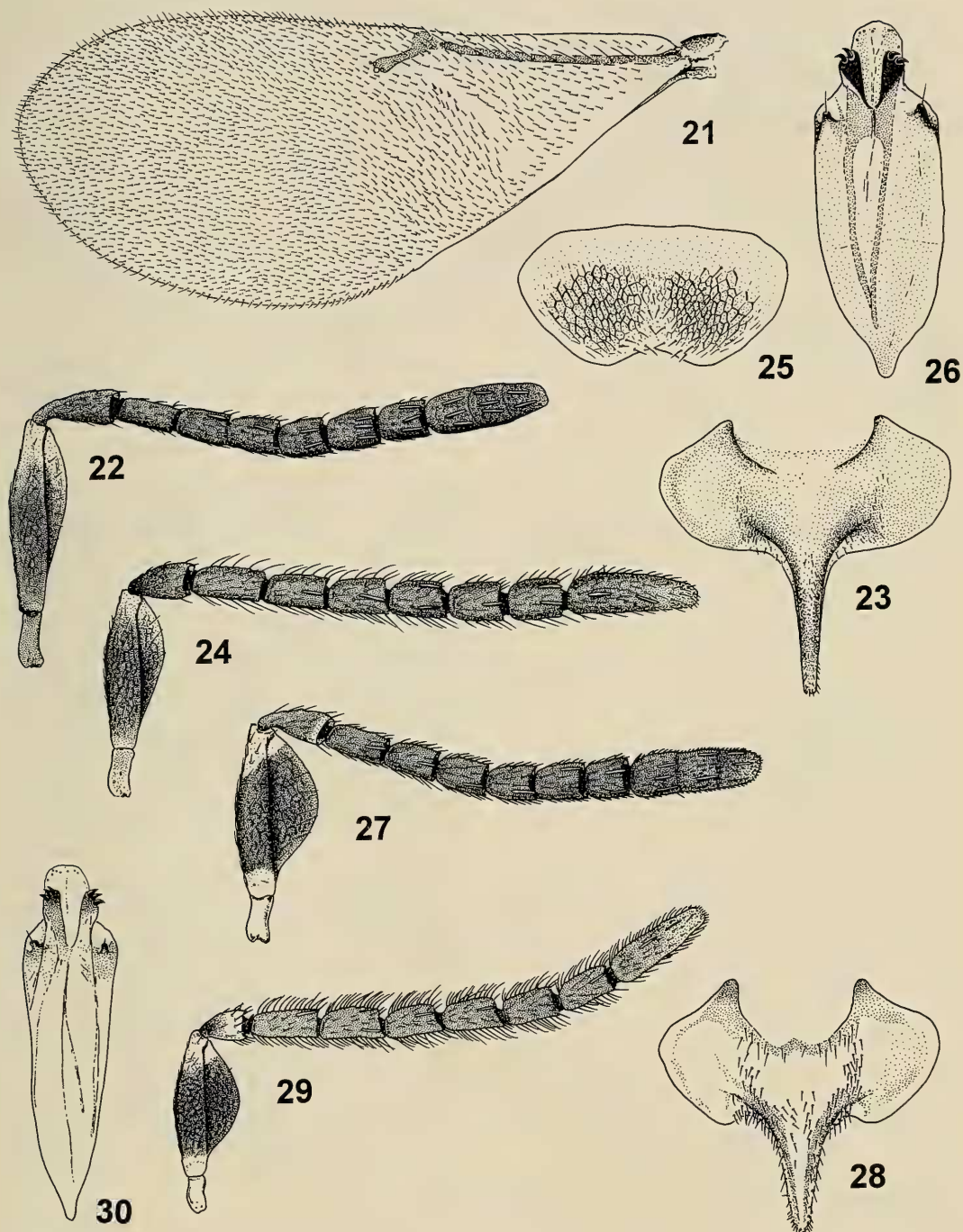
Hosts and biology.—Unknown.

Material examined.—*Holotype* female: USA, Texas, Hidalgo Co., Bentsen-Rio Grande SP, 2-6.iv.1989, J.S.Noyes (BMNH). *Paratypes*: same data, 1 female, 4 males (1 male in microslide # OSU-0006); same data, 3.vii.1982, G. A. P. Gibson, 1 male; Texas, Brewster Co., Big Bend N.P., 9-16.vii.1982, G. A. P. Gibson, 2 females, 5 males (1 female in microslide # OSU-0005); Texas, Jeff Davis Co., Davis Mts. St. Park, 4800', 18.vii.1982, G. A. P. Gibson, 1 female; Texas, Brazos Co., College Station, Lick Creek Park, 20.ix.1992, J. S. Noyes, 1 female; Texas, Culberson Co., Guadalupe Springs, 5200', 20-22.vii.1982, G. A. P. Gibson, 1 female (Paratypes in BMNH, CNCI, and OSUC)

Distribution.—USA (Texas).

Etymology.—The name reflects the dark, almost black color of the head and body.

Diagnosis.—Differs from all other species of *Mucencyrtus* by the dark color of the head and the body.



Figs. 21-30. 21, *M. variabilis*, forewing. 22-26, *M. atratus*. 22, Female antenna. 23, Female hypopygium. 24, Male antenna. 25, Male hypopygium. 26, Male genitalia. 27-30, *M. arundinariae*. 27, Female antenna. 28, Female hypopygium. 29, Male antenna. 30, Male genitalia.

Mucroncyrtus dbari Sharkov,

NEW SPECIES

(Figs. 9, 17, 31)

Female (holotype).—Body length 1.9 mm.

Relative measurements.—*Head* width 1.85 times head length and 1.3 times head height (72:39:55). Frontoververtex width at level of anterior ocellus 0.32 times width of head (23:72). Ocelli in right triangle. POL:OOL:LOL:OCL = 15:2:9:7. OOL 0.37 times diameter of posterior ocellus (1.5:4). Distance between antennal toruli 2.3 times distance between antennal torulus and eye orbit, and 2.3 times distance between torulus and mouth margin (14:6:6). Malar space 0.54 times mouth width and 0.36 times height of eye (15:28:42). Eye oval, maximum diameter 1.28 times minimum diameter (46:36). Posterior orbit of eye reaching occipital margin (dorsal view); temple not visible from above. Antenna as in Fig. 17. Scape broadened and flattened, length 2.55 times maximum width (28:11).

Mesosoma length 1.25 times width (85:68). Mesoscutum length 0.51 times width (35:68). Scutellum length almost equal to its width (37:38). Mid tibial spur slightly shorter than mid basitarsus and 0.34 as long as midtibia (21:23:62). Forewing is shown in Fig. 31. Forewing length 2.34 times maximum width (148:63).

Metasoma length 1.17 times width (75:64). Pygostyli closer to base than to apex of metasoma; distance from pygostyli to base of metasoma 0.6 times corresponding distance to apex of metasoma (28:47).

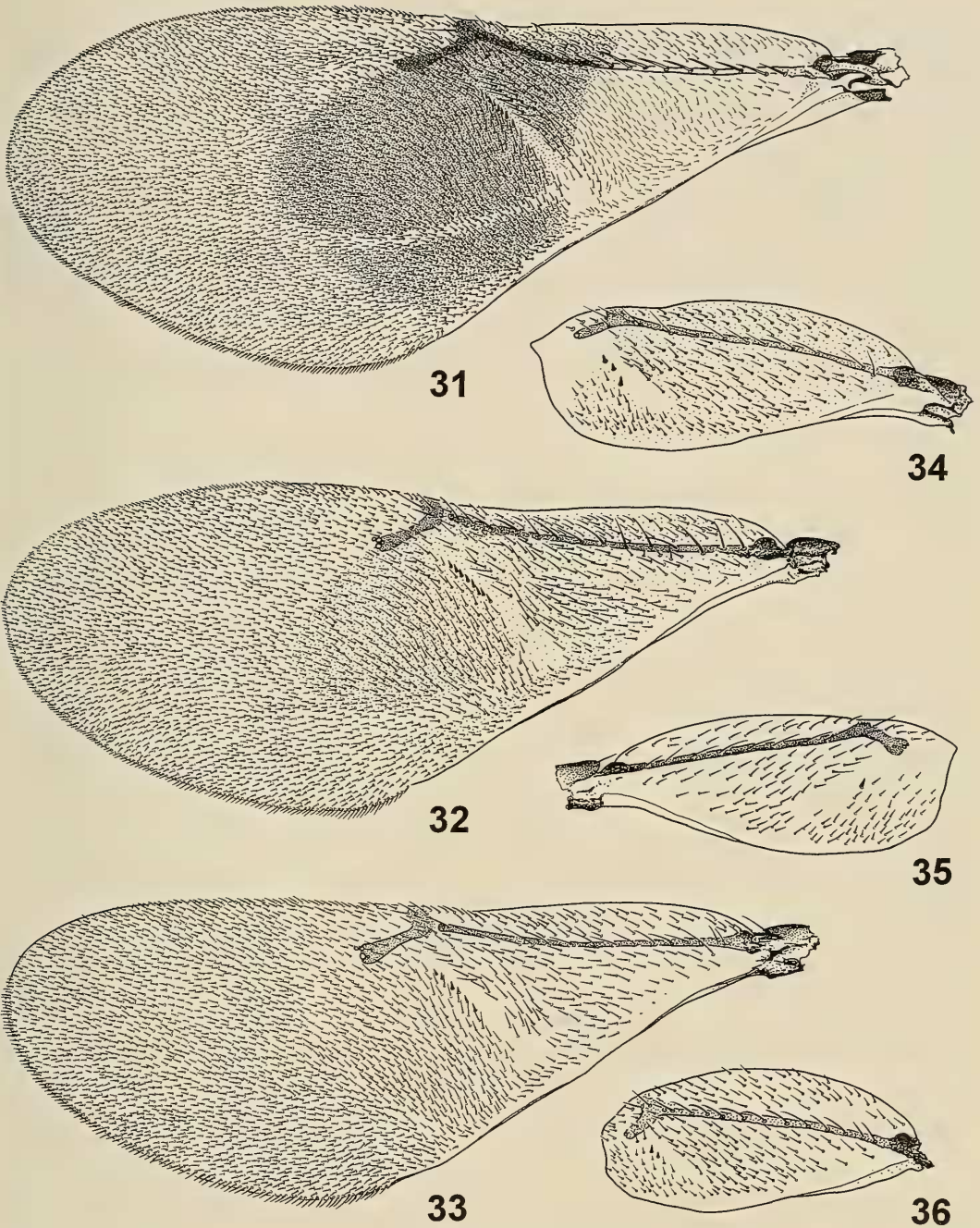
Color.—*Head*: Frontoververtex orange; face yellowish white, except for small brown spot at upper end of carinate part of interantennal prominence, and with slightly larger transverse brown spot at its lower end, and brown area between antennal scrobe and eye orbit; gena dark brown, almost black, except for yellowish white area adjacent to eye orbit that gradually becomes brown in upper part (Fig. 9); occiput dark brown, except for narrow yellowish area

behind eye. Antenna with radicle dark brown; scape dark brown, almost black, except for whitish base and apical $\frac{1}{5}$; pedicel brown with lighter apical part; funicle and clava brown. Mandibles brown.

Mesosoma: Pronotum with collum dark brown, almost black; collar white anteriorly and dark brown posteriorly; sides dark brown, except for white anterolateral corner, adjacent to fore coxa. Mesoscutum dark brown, very slightly lighter, dark orange brown laterally and anteriorly, except in middle. Axillae dark brown, very slightly lighter than mesoscutum. Scutellum dark brown, with brownish orange sides and apex, and with small dark brown orange area anteriorly in middle, near connection of axillae. Mesopleuron brown, with white posterior $\frac{1}{5}$. Forewing with very light, almost whitish, hyaline basal $\frac{1}{3}$, large dark (brownish) infuscated area in middle $\frac{1}{3}$, and hyaline apical $\frac{1}{5}$; setae and part of submarginal vein corresponding to basal $\frac{1}{3}$ of forewing lighter in color than setae in middle and apical $\frac{1}{3}$ of wing (Fig. 31). Fore leg with coxa white, femur brownish white, with white base and apex; tibia brownish white, and tarsus whitish light brown. Middle leg with coxa brown, femur white, tibia brownish white with lighter lower surface, mid tibial spur and tarsus brownish white with apical tarsomeres gradually becoming slightly darker, whitish brown. Hind leg with coxa brown, femur brown except for small white area near its apex on upper surface, tibia brown with whitish base, and gradually becoming brownish white in apical $\frac{1}{5}$; tarsus whitish light brown. Metanotum and propodeum dark brown, almost black, lighter in middle part. Anterolateral corner of propodeum (adjacent to hindwing base) white.

Metasoma: Dark brown, almost black dorsally, and slightly lighter, dark-brown to brown ventrally. Exserted part of ovipositor sheaths brownish white.

Sculpture and pubescence.—*Head*: Frontoververtex reticulate, with more or less isodiametric cells, and with very shallow,



Figs. 31–36. Forewings. 31, *Mucronecyrtus dbari*, female. 32, *M. arundinariae*, female. 33, *M. ecuadorensis*, female. 34, 35, *Mucronecyrtus* sp. aff. *ferrierei*: 34, Female; 35, Male. 36, *M. ferrierei*, female.

inconspicuous punctures, the punctures slightly better visible around anterior ocellus. Gena laterally with elongate-reticulate sculpture and scattered shallow punctures.

Mesosoma: Pronotum finely reticulate. Mesoscutum very finely reticulate, with rather dense setiferous punctures. Axillae reticulate. Scutellum reticulate with cells

larger and deeper than on mesoscutum, elongate in central part, and more or less isodiametric anteriorly, laterally and posteriorly. Mesopleuron finely reticulate, with cells more or less isodiametric, shallower than on other parts of mesosoma. Propodeum reticulate, with weakly expressed carinae in middle part, the carinae slightly diverging posteriorly. Dorsal surface of mesosoma with brownish translucent setae, the setae appearing slightly darker on whitish anterior part of collar of pronotum. Setae on apex of scutellum and on anterolateral corner of propodeum whitish, translucent.

Metasoma with first tergite transversely reticulate anteriorly, and more or less isodiametrically reticulate posteriorly; other tergites reticulate, with cells becoming slightly larger and shallower toward the apex of metasoma.

Male unknown.

Hosts and biology.—Unknown.

Material examined.—*Holotype* female: COSTA RICA, Guanacaste Pv, Sta. Rosa NP, Hacienda, Janzen & Gauld, 10-31.i.1987 (antenna and forewing in microslide # OSU-0004) (BMNH)

Distribution.—Costa Rica.

Etymology.—Named after my friend and colleague, Abkhazian hymenopterist Roman S. Dbar.

Diagnosis.—Close to *M. aclerdae*, from which it differs by characters given in the key: more strongly broadened and flattened scape, greater distance between antennal toruli, and different color of the head and mesosoma.

Mucrencyrtus ecuadorensis Sharkov,

NEW SPECIES

Figs. 18, 33

Female (holotype).—Body length 1.7 mm.

Relative measurements.—*Head* width 1.77 times head length and 1.26 times head height (62:35:49). Frontovortex width at level of anterior ocellus 0.37 times width of head (23:62). Ocelli in very slightly acute triangle, with angle at anterior ocellus of

85°. POL:OOL:LOL:OCL = 15:2:10.5:5. OOL 0.74 times diameter of posterior ocellus (2:2.7). Distance between antennal toruli 1.37 times distance between antennal torulus and eye orbit and 1.47 times distance between torulus and mouth margin (11:8:7.5). Malar space 0.68 times mouth width and 0.38 times height of eye (13:19:34). Eye oval, maximum diameter 1.2 times minimum diameter (36:30). Posterior orbit of eye almost reaching occipital margin (dorsal view). Antenna as in Fig. 18. Scape subcylindrical, with very weakly developed flange, its length 3.43 times maximum width (24:37).

Mesosoma length 1.3 times width (68:52). Mesoscutum width 1.73 times length (52:30). Scutellum length slightly less than width (28:31). Mid tibial spur 0.88 as long as mid basitarsus and 0.27 as long as mid tibia (15:17:55). Forewing is shown in Fig. 33. Forewing length 2.51 times maximum width (118:47).

Metasoma length 1.2 times width (65:55). Pygostyli closer to base than to apex of metasoma. Distance from pygostyli to base of metasoma 0.54 times corresponding distance to apex of metasoma (23:42).

Color.—Head and body largely yellow. Antennae yellow. Mandibles with brown apical ½ Collum of pronotum slightly brownish in area of its contact with occiput. All legs yellow. Mesopleuron yellowish brown, lighter in anterior part, and darker (brown) in posterior part. Forewing hyaline. Metasoma brownish yellow, with darker dorsal side.

Sculpture and pubescence.—*Head* reticulate, with shallow punctures on frontovortex, which appears almost hairless, with very short, minute, translucent hairs on vertex, face, and genae, and longer setae on clypeus.

Mesosoma: Mesoscutum and scutellum minutely, superficially reticulate, with cells on scutellum very slightly elongate, but not deeper than on mesoscutum. Collar of pronotum, mesoscutum, axillae and scutellum with appressed brownish hairs.

Metasoma dorsally shallowly reticulate and almost hairless, laterally and ventrally with translucent hairs, the hairs denser on ventral surface.

Male unknown.

Hosts and biology.—Unknown.

Material examined.—*Holotype* female: ECUADOR: Pichincha, 47 km S Santo Domingo, Rio Palenque Station, 28.v.1975, S.&J. Peck (antenna and forewing on microslide #OSU-0007) (CNCI).

Distribution.—Ecuador.

Etymology.—Name refers to the country of origin.

Diagnosis.—Similar to *M. ferrierei* (Burks), from which it differs by the color of the mesopleuron, which is darker than the rest of mesosoma, and by the more slender scape.

Mucencyrtus ferrierei (Burks)
(Figs. 19, 20, 36)

Aenasioidea ferrierei Burks, 1964: 18. *Holotype* female, USA (USNM) (not examined).

Mucencyrtus ferrierei: Noyes and Woolley, 1994: 1332.

Distribution.—USA: Maryland, Virginia, Georgia, Florida, Texas.

Hosts and biology.—Reared from *Aclerda andropogonis* McConnell on *Andropogon virginicus* (Burks, 1964).

Comments.—The species was described from 27 brachypterous females and 4 macropterous males reared from same host (Burks, 1964). I have examined 7 paratype females and 2 paratype males from the USNM, and additional 80+ specimens from Georgia, Florida and Texas that are conspecific with the specimens of the type series. A further 61 specimens from Virginia, Florida and Texas are very similar to *M. ferrierei*, but differ by darker (dark brown to almost black) funicle and clava, slightly more elongated funicular segments, and a dark spot or band in the middle part of the scape in females and males (Figs. 10, 12). The sculpture of the scutellum (especially

in its posterior ½) in these specimens consists of slightly larger cells than those on the mesoscutum, and the pubescence of the scutellum is relatively sparser than in specimens of the type series of *M. ferrierei*. Forewing rudiments in brachypterous specimens are relatively more elongated, with rounded or pointed, but never truncate apex (Figs. 34, 35). The apical extension of hypopygium is relatively longer than in specimens of the type series of *M. ferrierei* (Fig. 11). However, despite all these differences, I am not confident enough to describe a new species for these specimens until more material is obtained and the variability of *M. ferrierei* is studied in greater detail. Therefore, at the present time I have identified these specimens as *Mucencyrtus* sp. aff. *ferrierei*, and in the key they will key to *M. ferrierei*.

Variation.—In addition to the features listed above, some characters may vary as follows. Forewings in both sexes may be fully developed to very short and rudimentary, with all transitional forms. Dark areas on the occiput, pronotum and mesoscutum in males may vary from well expressed to completely absent. The scape may have a small dark spot in the middle, and the funicle and clava may be yellowish brown, slightly darker than scape. Dorsal surface of propodeum, except median part, may be darkened, yellowish brown or brown.

Mucencyrtus insulanus Noyes

Mucencyrtus insulanus, Noyes, 1980: 214. *Holotype* female, Trinidad (BMNH) (not examined).

Distribution.—Trinidad, St. Vincent.

Hosts and biology.—Reared from *Aclerda* sp. on sugarcane (Noyes, 1980).

Material examined.—*Paratypes*: TRINIDAD: Orange Grove, i.1973, ex *Aclerda* sp. on sugarcane (F. D. Bennett), 1 female (BMNH); Curepe, Santa Margarita Circular Road, 15–18.i.1974 (F. D. Bennett), 1 female (CNCI); ST. VINCENT: St. George,

Argyle, 8.vii.1976, coastland (J. S. Noyes), 1 male (BMNH).

Comments.—This species is very similar to *M. ferrierei*, differing from it by the deeper and finer sculpture of the scutellum compared to that of the mesoscutum, and more slender scape.

Mucroncyrtus variabilis Sharkov,

NEW SPECIES

Figs. 6–8, 13–16, 21

Female (holotype).—Body length 1.24 mm.

Relative measurements.—*Head* width 1.77 times head length and 1.23 times head height (48:27:39). Frontovertex width at level of anterior ocellus 0.47 times width of head (22.5:48). Ocelli in an obtuse triangle, with angle at anterior ocellus of 113°. POL: OOL:LOL:OCL = 15:1.5:9.5:4.5. OOL 0.75 times diameter of posterior ocellus (1.5:2). Distance between antennal toruli 1.25 times distance between antennal torulus and eye orbit and twice distance between torulus and mouth margin (10:8:5). Malar space 0.77 times mouth width and 0.58 times height of eye (14:18:24). Eye oval, maximum diameter 1.22 times minimum diameter (27:22). Posterior orbit of eye reaching occipital margin (dorsal view). Antenna as in Fig. 13. Scape very slightly broadened and flattened, length 3.4 times maximum width (17:5).

Mesosoma length 1.15 times width (51:44). Mesoscutum width 2.44 times length (44:18). Scutellum length slightly less than width (24:26). Mid tibial spur 0.88 as long mid basitarsus and 0.28 as long as mid tibia (10.5:12:37). Forewing as in Fig. 21. Forewing length 2.31 times maximum width (95:41).

Metasoma length approximately equal to width (52:51). Distance from pygostyli to base of metasoma 0.48 times corresponding distance to apex of metasoma (17:35). Hypopygium as in Fig. 15.

Color.—*Head* yellow, except for dark-brown oblique spot on gena (Figs. 7, 8) and large dark-brown spot on occiput occupy-

ing area of contact of occiput with collum of pronotum. Antennae entirely yellow. Mandibles with yellow basal and brown apical parts.

Mesosoma: Pronotum with collum dark brown in area of its contact with occiput, and yellow on upper edge and sides; collar yellow. Mesoscutum yellow, slightly darker, brownish yellow, anteriorly, and slightly lighter, whitish yellow, posteriorly. Axillae yellow with anterior margin dark-brown, and inner corner, and lateral and posterior margins brown. Metanotum and propodeum dark brown, except anterolateral corners of propodeum (adjacent to hindwing base and anterior to spiracle) whitish yellow. Mesopleuron whitish yellow. Tegula light brown with whitish-yellow base. Forewing hyaline, very slightly, almost inconspicuously suffused yellow in basal $\frac{1}{3}$ or so. All legs completely yellow.

Metasoma dorsally yellowish brown, darker (almost dark brown) in basal part, gradually becoming lighter in apical part, so IX syntergite is brownish yellow; laterally brownish yellow and yellow ventrally.

Sculpture and pubescence.—*Head*: Frontovertex, face and genae shallowly reticulate, with numerous small, shallow punctures and very minute, translucent, inconspicuous hairs on genae and face between antennal scrobe and eye orbit.

Mesosoma: Pronotum, mesoscutum, axillae and scutellum shallowly reticulate, with numerous small setiferous punctures and appressed brownish translucent hairs. Metanotum and propodeum dorsally transversally reticulate, except for median part; sides of propodeum with translucent hairs.

Metasoma dorsally shallowly reticulate, anteriorly with transverse cells; almost hairless dorsally, and with brownish translucent hairs on lateral part of tergites and on sternites.

Male.—Similar to female in structure and coloration. Antenna as in Fig. 16.

Variation.—This species exhibits the greatest variation in structure and color among the members of the genus *Mucron-*

cyrtus. The two most variable features are the size of the eyes and the degree of expression of the dark oblique spot on the gena. In some specimens (females and males) from Texas the eyes are very small (Figs. 6, 7), the eye height is about $\frac{1}{2}$ the height of the head (16:33), and the eye length is only about 0.7 the length of the head. The posterior orbit of the eye in this case does not reach the occiput, so that the temple is well visible from above, and the length of the temple constitutes more than $\frac{1}{5}$ the head length (5:22). Other proportions of the parts of the head also vary respectively. The width of the frontovertex in small-eyed specimens is more than $\frac{1}{2}$ the head width (22:39) and the OOL is up to twice the ocellus diameter (4:2). The dark-brown oblique spot on the gena varies in size and darkness (Figs. 7, 8), and may be completely absent. There is no correlation between the two features, or between either feature and geographical origin of the specimens. Specimens with large, small, and intermediate size eyes were collected from same locality in Texas, although only large-eyed specimens are known so far from Arizona, California, and Mexico. The hypopygium of a small-eyed specimen is shown in Fig. 14. Males from Mexico are slightly darker colored than the specimens from the USA. They have an orange frontovertex, a dark-brown spot in the middle part of the scape, a brown funicle, and brown to dark-brown anterior $\frac{1}{2}$ or so of the mesoscutum and the base of the scutellum. In one male from Texas the anterior margin of the mesoscutum is dark brown, but the dark area does not extend as far posteriorly as in Mexican specimens. In some specimens the scape is slightly more broadened, its length being 3.1 times its maximum width.

Hosts and biology.—Unknown.

Material examined.—*Holotype* female: USA: Arizona, Portal, Cave Creek Canyon, viii.1977, L. Masner (CNCI). *Paratypes*: USA: Arizona, Cochise Co., 12 km S. Sierra Vista, Ramsey Canyon, 1700 m, 29.vi.1987, 9.vii.1987, B. V. Brown, 4 females, 2 males

(1 female in microslide # OSU-0009); Arizona, Cochise Co., Chiricahua Mts., S.W.R.S., 5400', 4-7.v.1980, V. Roth, 1 female; California, San Luis Obispo Co., 8 mi ESE Simmler, San Diego Creek, 22-30.vi.1987, D. B. Wahl, 1 female; Texas, Presidio Co. Big Bend Ranch SNA, 29°30'45"N 103°51'56"W, el. 4400', 21.vi.1990, Woolley & Zolnerowich, 2 females; same data, 19 & 21.vi.1990, Zolnerowich, 4 females, 1 male (1 female in microslide # OSU-0008); same data, 29°30'20"N 103°52'15"W, 21 & 23.vi.1990, Zolnerowich, 1 female, 1 male; same data, 1.8 mi W Los Alamos Rn., 19.x.1990, el. 4360', Zolnerowich, 1 male; Texas, Brewster Co., Big Bend National Park, No. Rosillos Mts. Buttrill Spring, 29°31'53"N 103°15'22"W, el. 5370', 15.vi.1991, G. Zolnerowich, 1 male; same data, 15-18.vi.1991, Wharton & Whitefield, cottonwood, malaise trap, 1 female; same data, 10-9.vii.1991, R. Vogtsberger, 1 male; Texas, Brewster Co., Big Bend N.P., 5200', 9.vii.1982, G. A. P. Gibson, 1 female; Texas, Burnet Co., Inks Lake St. Park, 2.v.1987, J. B. Woolley, 1 female; Texas, Val Verde Co., Seminole Cyn. St. Park, 20.vii.1986, Woolley & Zolnerowich, 1 male; Texas, Comal Co., Guadalupe River St. Park, 18.viii.1988, G. Zolnerowich, 1 male; Texas, Jeff Davis Co., Davis Mts. St. Park, 5000', 17-18.vii.1982, G. A. P. Gibson, 5 males (1 male in microslide # OSU-0010); Texas, Hidalgo Co., Bentsen-Rio Grande S.P., 2-6.iv.1989, J. S. Noyes, 1 female; Texas, (Starr Co.), Falcon Lake S.P., 8.iv.1989, J. S. Noyes, 1 female; MEXICO: Veracruz, 3 mi NE Huatusco, 22.vii.1985, J. Woolley & G. Zolnerowich, 1 female; same data, 23.vii.1984, J. B. Woolley, 1 male; Puebla, 5 mi SE Izucar de Matamoros, 20.vii.1984, J. B. Woolley, 2 males (Paratypes in BMNH, CNCI, OSUC, and TAMU).

Distribution.—USA (Arizona, California, Texas), Mexico.

Etymology.—The name reflects the high degree of intraspecific variation.

Diagnosis.—From *M. aclerdae*, which

also possesses a dark oblique spot on the gena, this species differs by the absence of a dark infuscation from the forewing. Specimens that lack the dark spot from the gena resemble *M. ferrierei*, from which they differ in the obtuse anterior angle of the ocellar triangle, the darker metanotum and dorsal part of propodeum, and, usually, the more slender scape.

Mucrencyrtus sp.

This undetermined species is known only from three males collected in a Malaise trap in Uruguay. It is not included in the key.

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